

Acknowledgement

First of all we would like to thank our course instructor Mr. Muhammad Kamal Hossen for his valuable advice and guidelines throughout the course. Besides, we are also grateful to Mr. MD Redwan Ullah , Manager, Grameen Bank, Shantir hat, Rangunia, Chittagong for giving us his valuable time and information about the bank.

Chapter One

Problem Analysis and Requirement Specifications

Introduction:

System analysis and design is the assessment of a predicament and effective designing of its solution. Systems analysis is effectual when all aspects of the problems are evaluated. It dissects a system into its component pieces to study how those interact and work. System design involves the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements.

Objectives:

We were determined to collect various information about our chosen organization as well as the organizational hierarchy. Questionnaire was prepared as relevant as possible for the purpose of information gathering. Qualitative and quantitative information gathering and categorizing them was also an objective.

Person interviewed:

Mr. MD Redwan Ullah

Manager

Grameen Bank, Shantir hat, Rangunia, Chittagong

Overview of the system:

Location of the organization:

Grameen Bank head office address -- Grameen Bank Bhaban, Mirpur-2, Dhaka-1216, Bangladesh. This organization has around 2600 branches throughout the country. We gathered information from a branch situated in Shantir hat, Rangunia, Chittagong.

Basic Information of the organization:

Grameen Bank (GB) has reversed conventional banking practice by removing the need for collateral and created a banking system based on mutual trust, accountability, participation

and creativity. GB provides microcredit to the poorest of the poor in rural Bangladesh, without any collateral. At GB, credit is a cost effective weapon to fight poverty and it serves as a catalyst in the overall development of socio-economic conditions of the poor who being poor have been kept outside the banking. As of October, 2011, it has 8.349 million borrowers, 97 percent of whom are women. With 2,565 branches, GB provides services in 81,379 villages, covering more than 97 percent of the total villages in Bangladesh.

Reason to choose the organization:

Grameen Bank introduced a different platform of banking system. It provides credit to the poor section of our population which helps to eliminate poverty. But it does not have a good automated system. We think that through this project we can contribute to some extent. Moreover it is easy for us to gather information from this organization as we have good link there.

Information gathering:

Questionnaire:

- How every branches are managed?

Ans- every branches are made up of multiple centers (more than 15 centers). A field officer is in charge of at least 5 to 6 centers. He manages all the members (customers) of a particular center. He collects deposit money and loan repay money.

- What are the procedures to deposit money in the bank?

Ans- a person must be a member of Grameen Bank to deposit money and he/she should have a deposit account. Then, the member can deposit money through the field manager recording the data in the pass book.

- How to withdraw deposit money from the bank?

Ans- to withdraw deposit money the plan chosen by the customer must be fulfilled, that is, the timeline of deposit account must reach the end.

- What are the procedures to make a new account?

Ans- anyone who wants to open an account must apply to the bank with all of their economic and personal information, if the bank can verify those information correctly, then the applicant can have an account under a group of 5 to 6 other members.

- Who are able to receive loan from this bank?

Ans- poor people having no capital to introduce own small business, for poor women who wants do something productive, poor students, poor farmers, beggar.

- What types of loan activities the bank has?

Ans- Education loan

Housing loan for the poor

Micro-enterprise loans, etc

- What are the steps that users have to follow to receive loan?

Ans- every member must apply for a loan under their own group and through the field officer. If the application is approved by the branch officer then the member can take out loan.

- What are the plans to repay the loan?

Ans- the loan is payed on weekly basis within a specified time frame that depends on the loan amount. The loan of every member payed back through the group leader.

Management information:

Operational information:

- Motivating users to open accounts
- Opening new accounts
- Making groups of users under a specific center
- Receiving loan requests & approving
- Distributing microcredits
- Collecting loan repayments from borrowers
- Prepare loan collection sheet and weekly savings sheet

Tactical information:

- To materialize the strategic plans
- Suggest new services to top level managers
- Monitoring the branches after a specific period
- Collect information from the branches, inspect them and report the top level

Strategic information:

- Adding new services
- Adding new zone, area or branch
- Modifying loan and interest policy
- Analysis of competitor's strategy

Statutory information:

- Providing information to Bangladesh Bank
- Providing each and every update of the bank to the government

Requirment Specification:

System requirements specification specifies what information requirements will be provided. SRS is obtained after excessive discussions with the user. Analyst's aim is to develop SRS which is understandable by the user and which can be used for detailed design of the system. SRS should be complete, unambiguous and jargon free. SRS uses graphical aids understood by users who are not computer literate and will also be useful in design. Narratives of requirements by users are too long and imprecise. So, it needs conversion to precise specifications by following steps -

Step1: Analyze statement

Step2: Identify physical entities such as branch office, center etc.

Step3: Identify documents which are received/sent by each office and each centers

Step4: Draw a physical document

Analyzing the user's narrative statement, we find the following operational requirements-

- Digitalization of user account creation system, account's information database, balance checking and updating system
- Digitalization of loan services and loan information database

Level of management:

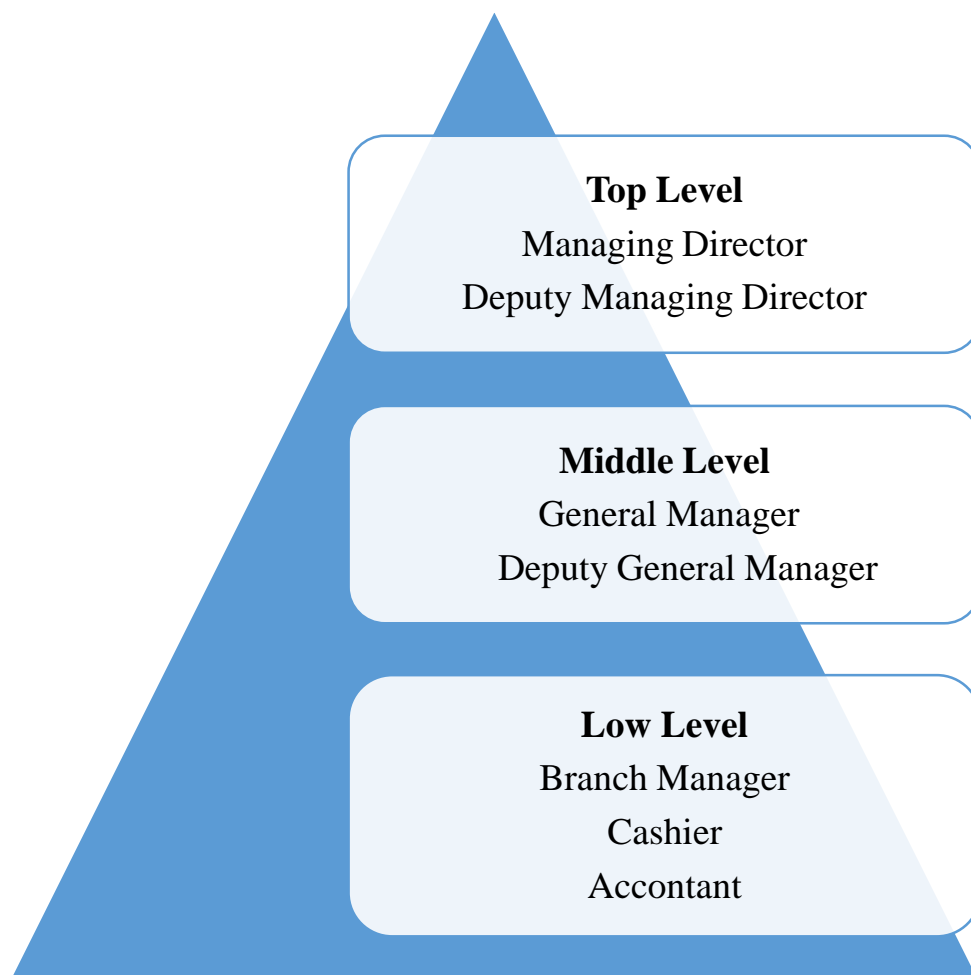


Figure 1.1: Level of Management

Organogram:

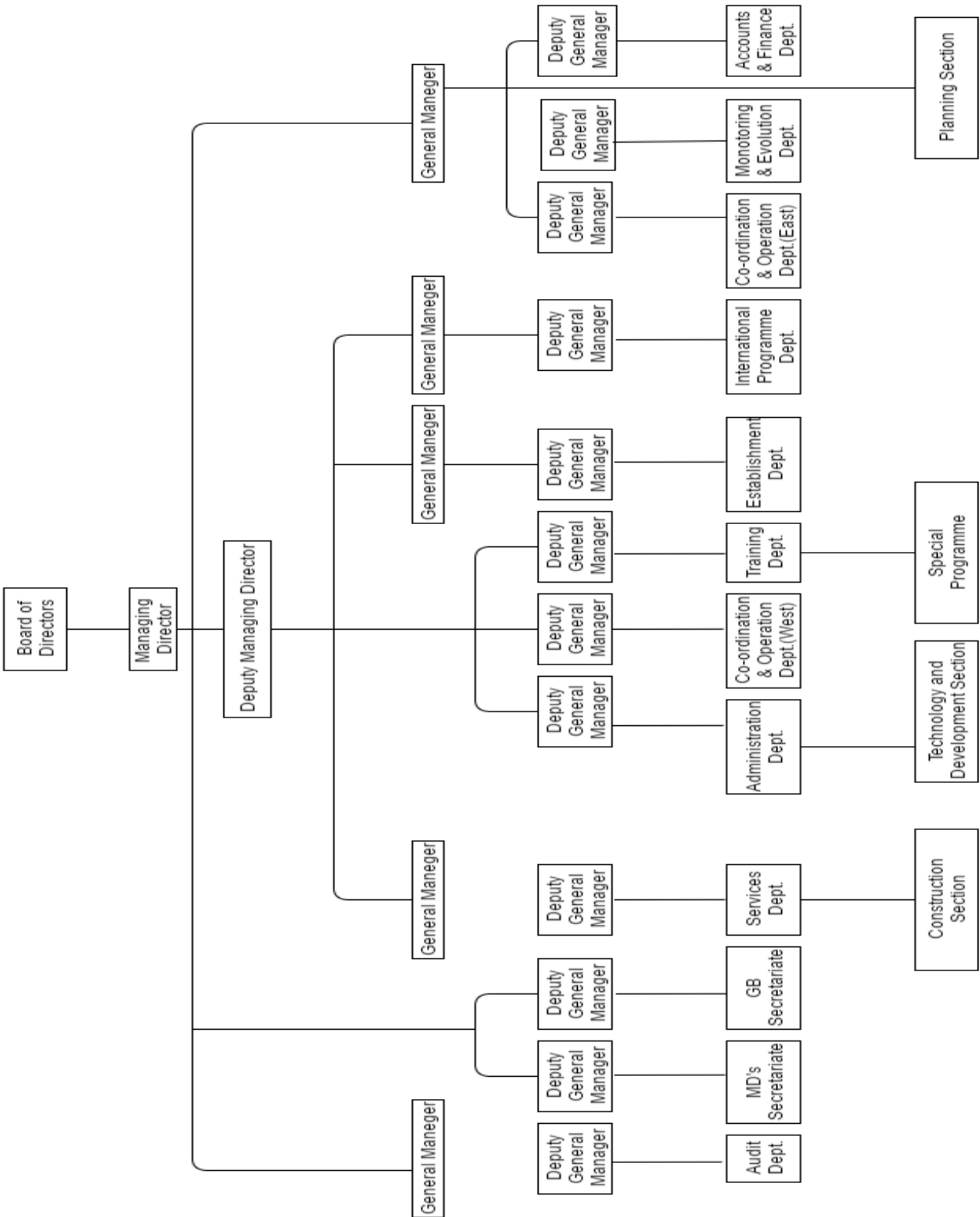


Figure 1.2: Organogram

Conclusion:

The primary task of system design and analysis is to gather information about the intended organization. Information gathering gave us a view of operational, tactical, strategic and statutory information. Hierarchy is made according to organization's statements. We tried our best to fulfill the requirement of our presentation. Information are appeared in summarized way.

Chapter Two

Analysis of the Organization

Introduction:

During the past several decade personnel function has been transformed from a relatively obscure record keeping staff to central and top level management function. There are many factors that have influenced this transformation like technological advances, professionalism and general recognition of human beings as most important resources.

A computer based management system is to be designed to handle all the primary information required to calculate monthly statements of customer account. This project intends to introduce more user friendliness in the various activities such as record updating, maintenance and searching. The entire information will be maintained in the database and will be kept in such a way that only authorized personnel will be able to retrieve the necessary information. The access of the information to the respective authorized personnel would be made easy.

Objectives:

The analysis and design phase of every banking system implementation starts by identifying and documenting current and target processes. Once we have a formal understanding of how the business works, we can focus our efforts on identifying the tasks necessary to change the initial banking system set up. So our main objectives are

- Drawing the Context Diagram
- Drawing the Data Flow Diagram (DFD)

Context Diagram:

A System Context Diagram is the highest level view of a system, similar to Block Diagram, showing a (normally software-based) system as a whole and its inputs and outputs from/to external factors. The Context Diagrams show the interactions between a system and other actors with which the system is designed to face. They are also typically drawn using labeled boxes to represent each of the external entities and another labeled box to represent the system being developed. The relationship is drawn as a line between the entities and the system being developed. Context Diagram is a data flow diagram showing data flows

between a generalized application within the domain and the other entities and abstractions with which it communicates.

The Context Diagram of our banking system is shown below:

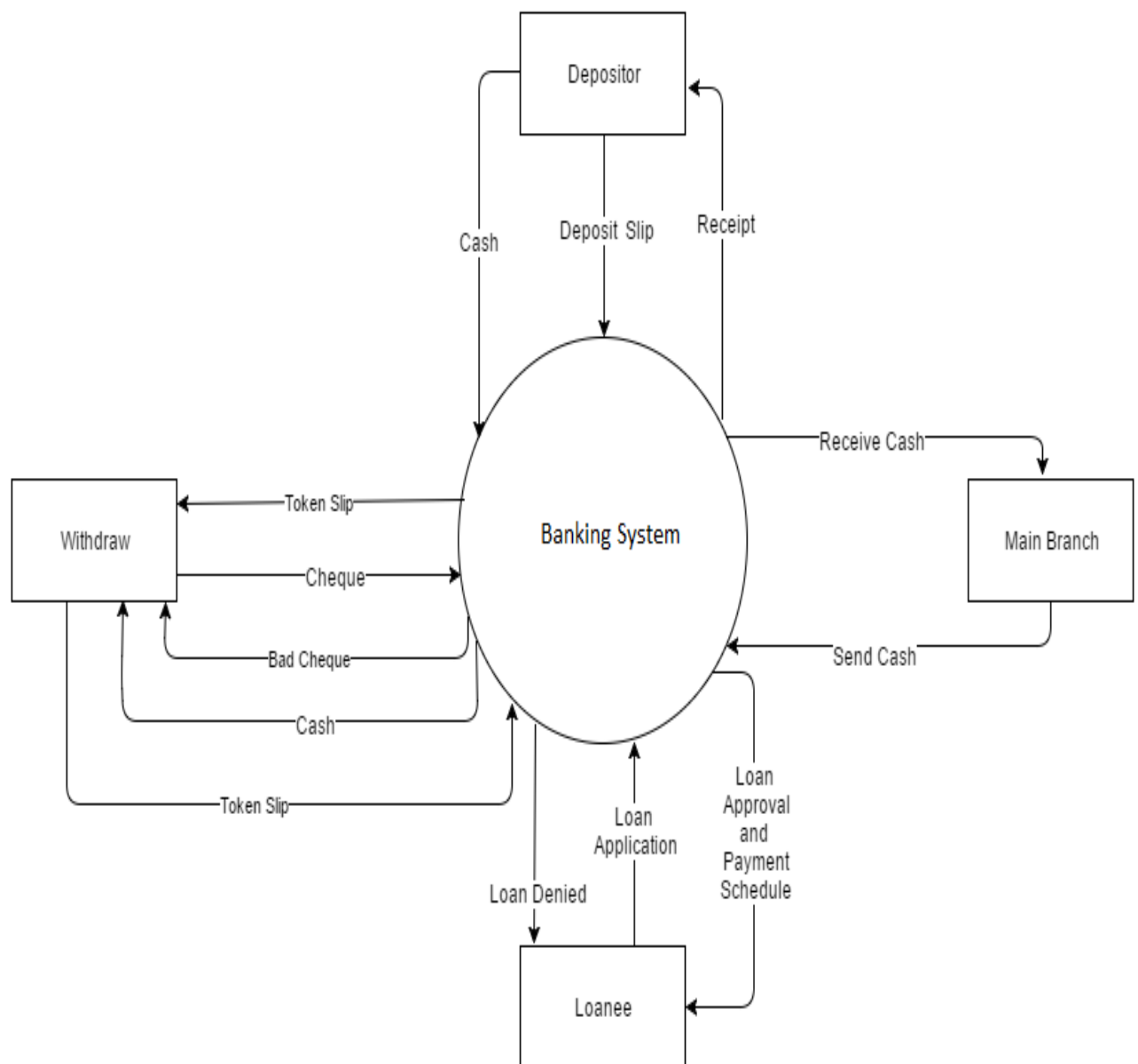


Figure 2.1: Context Diagram

Data Flow Diagram (DFD) :

Banking System DFD:

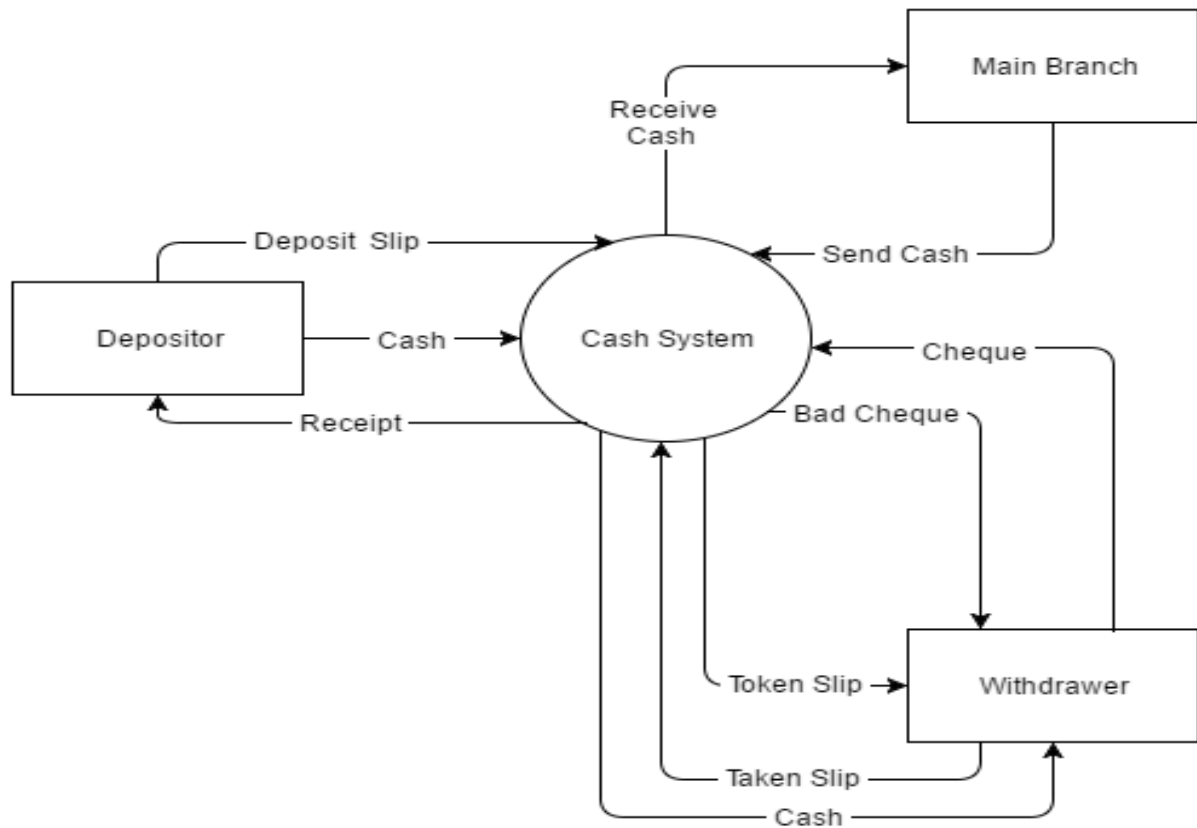


Figure 2.2(a): Banking System DFD

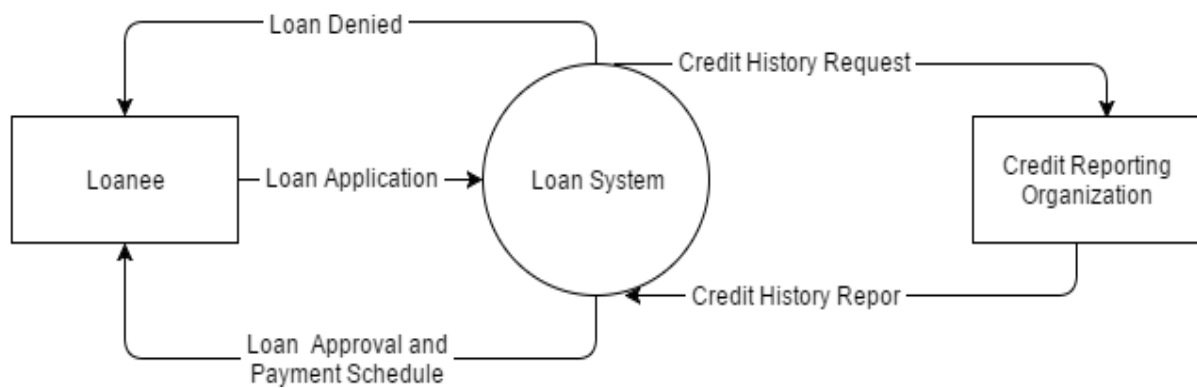


Figure 2.2(b): Banking System DFD

Cash System DFD:

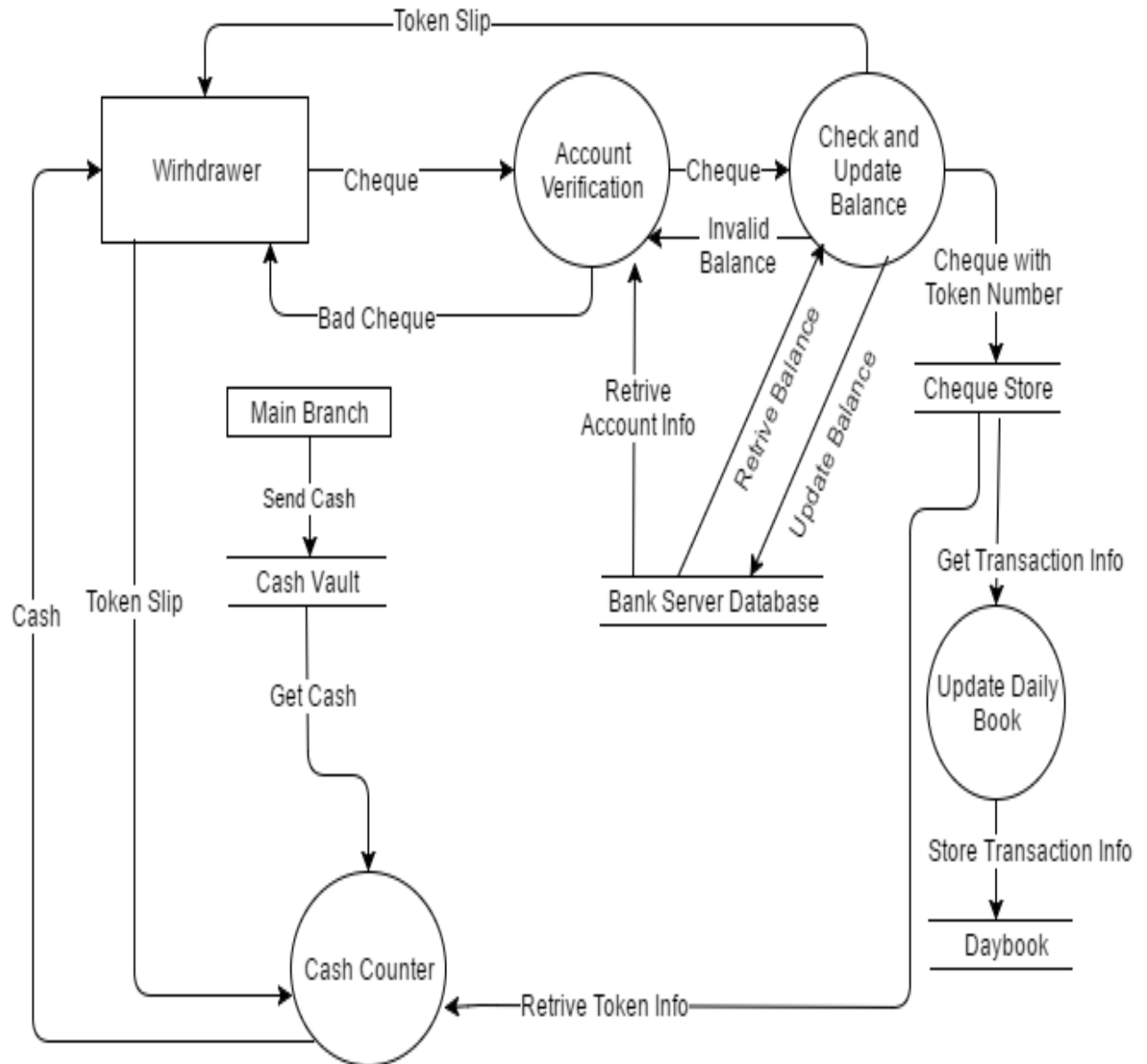


Figure 2.3(a): Cash System DFD

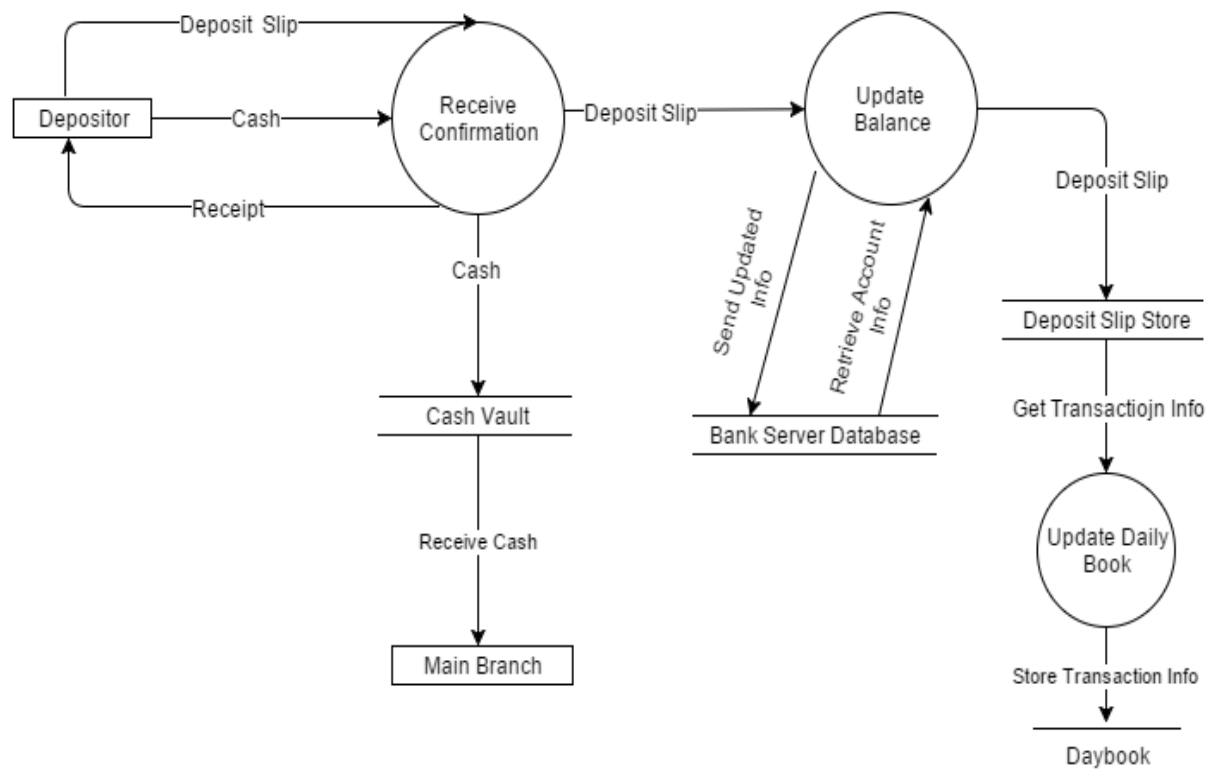


Figure 2.3(b): Cash System DFD Cont.

Loan System DFD:

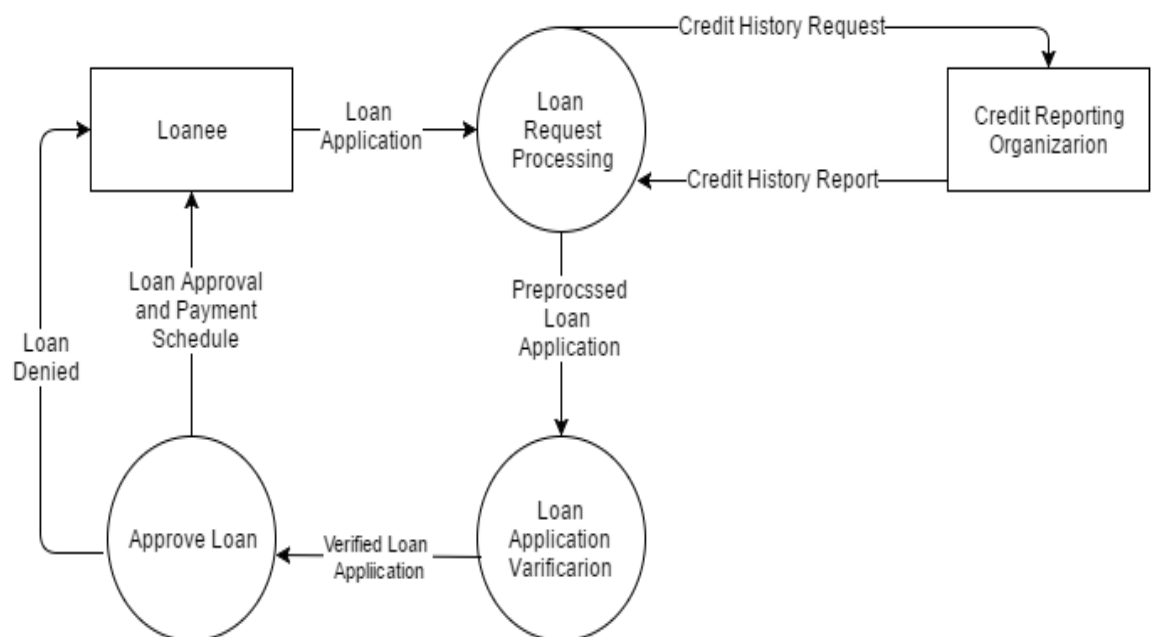


Figure 2.4: Loan System DFD

Conclusion:

DFD shows various processes and total working strategy of the organization. Also the life cycle describes the total process of our system design. We have used meaningful names for data flows, processes and data stores. We have top down development starting from context diagram and successively levelling DFD. Only previously stored data read for this report. We have represented by DFD which gives the systems overview, which is the context diagram. We leveled the DFD so it is very easy to understand and small. The system we are working with is very much big, thus DFD deals with various parts of the system and it's a very efficient tool. We have concluded with verifying the DFD and gathering information for the DFD here. Next process will be the feasibility analysis of the system.

Chapter Three

Object Oriented Analysis and Design of Systems

Introduction:

We have been basically dealing with a system that will run by both automated and man power. An automated system obviously requires a software which, in turn, requires trained man power to maintain and run it. Since our basic modification was to bring the system under one robust database and management site, our software should be based on database. The following sections discuss about UML class diagram that helps us realize the total software proposal that our company needs to implement or buy.

Since, we want now everything instantly updated through a secured database software, our proposed software forms will basically consist of the following issues. Customer account, Loan, Balance withdrawal and deposit, Employee. However, by means of UML class structure, we next define each class necessary to be implemented in the database software.

UML Diagram:

UML stands for Unified Modeling Language which is used in object oriented software engineering. Although typically used in software engineering it is a rich language that can be used to model an application structures, behavior and even business processes. There are 14 UML diagram types. They can be divided into two main categories; structure diagrams and behavioral diagrams. Some UML diagram types are listed below with examples and a brief introduction to them explaining how they are used when modeling applications.

Use Case Diagram:

A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal. It is represented using ellipse. Actor is any external entity that makes use of the system being modeled. It is represented using stick figure.

Use Case for Cash System:

Use Cases	Actors
Update Balance	Cashier
Deposit	Customer, Cashier
Withdraw	Customer, Cashier
Check Balance	Customer, Cashier

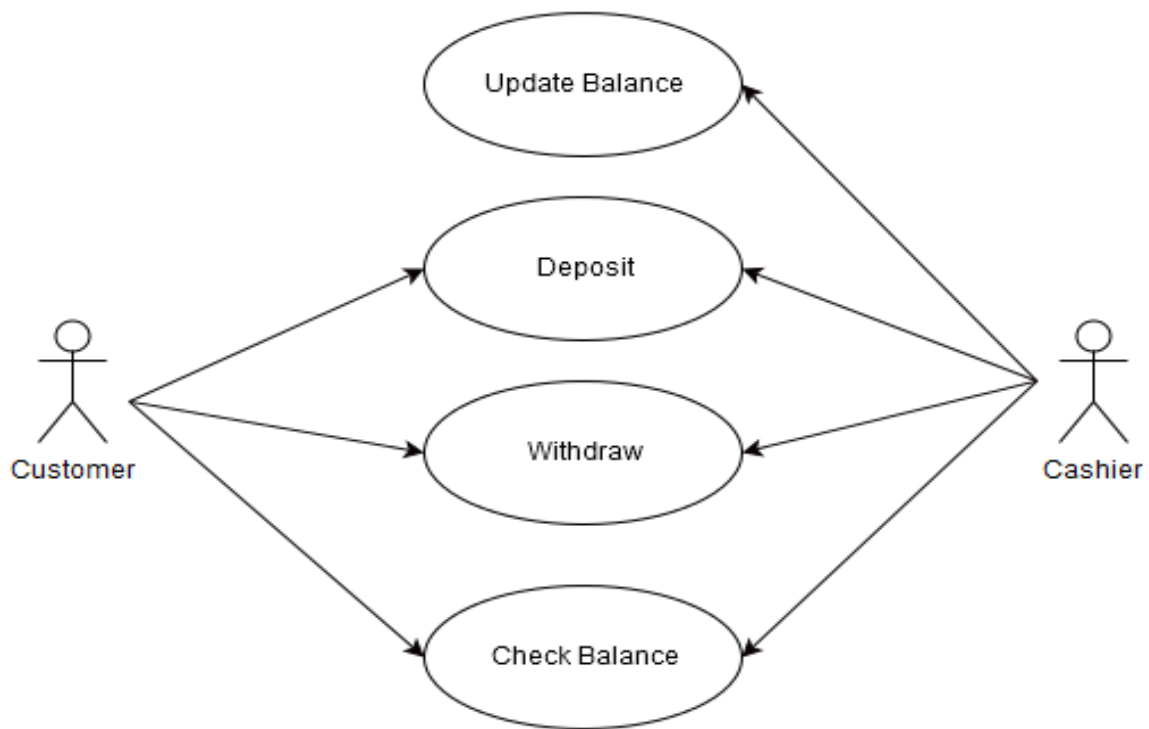


Figure 3.1: Cash System Use Case Diagram

Use Case for Loan System:

Use Cases	Actors
Request Loan	Customer, Field Officer
Approval of loan	
Take out loan	
Repay loan	

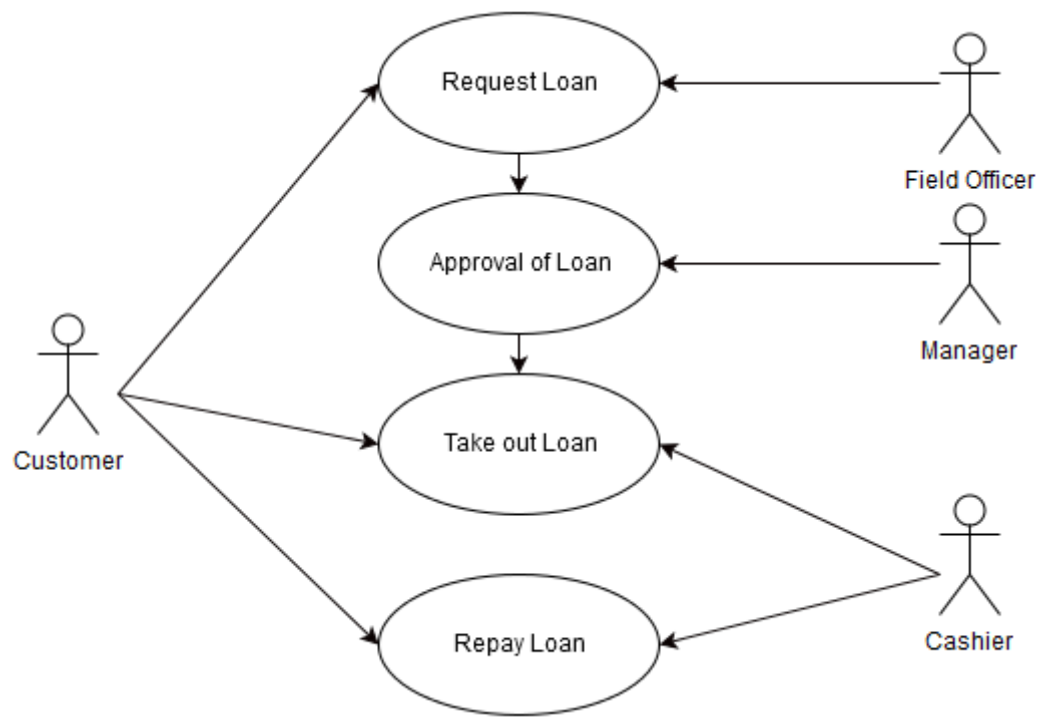


Figure 3.2: Loan System Use Case Diagram

Sequence Diagram:

A sequence diagram in Unified Modeling Language UML is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. There are two dimensions.

1. Vertical dimension-represent time
2. Horizontal dimension-represent different objects

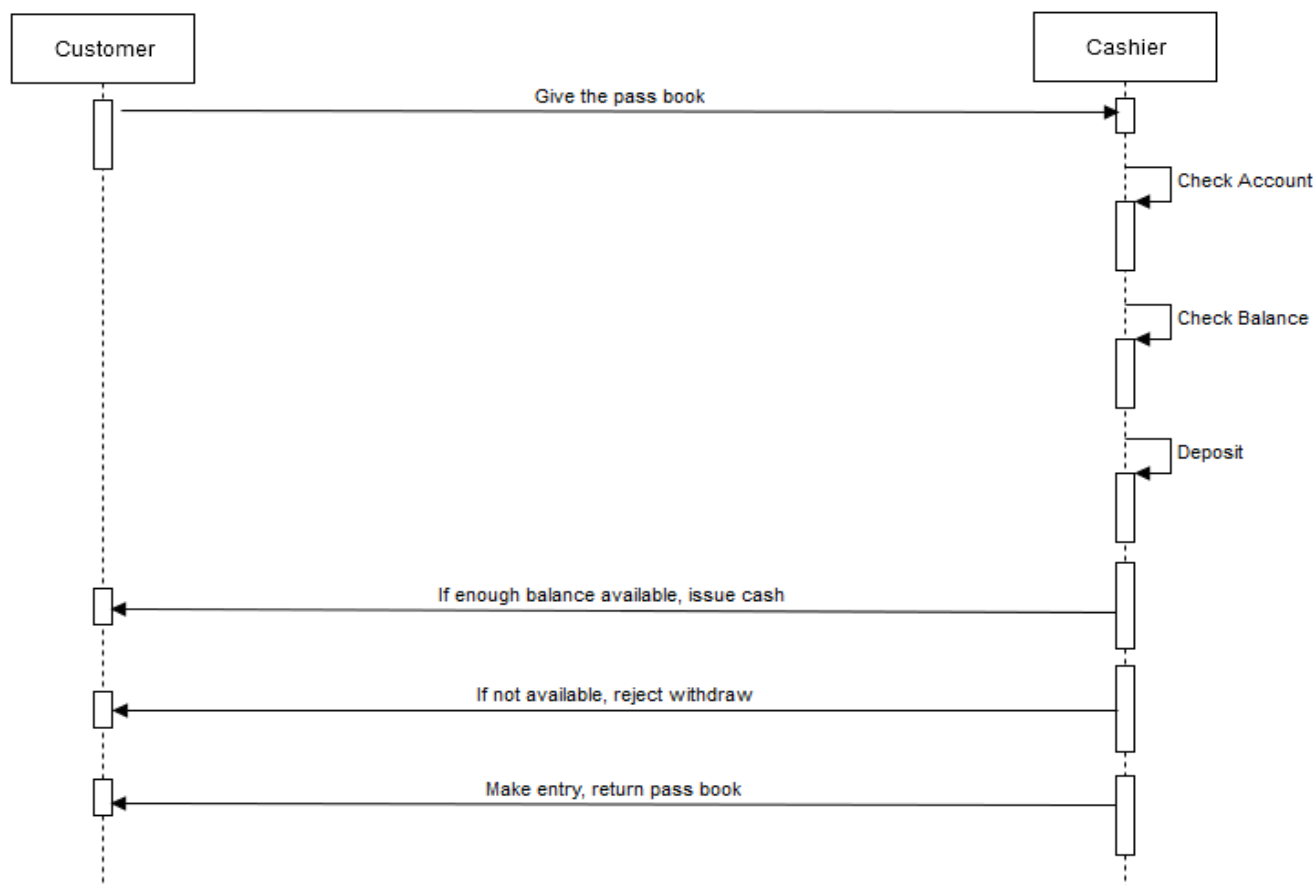


Figure 3.3: Cash System Sequence Diagram

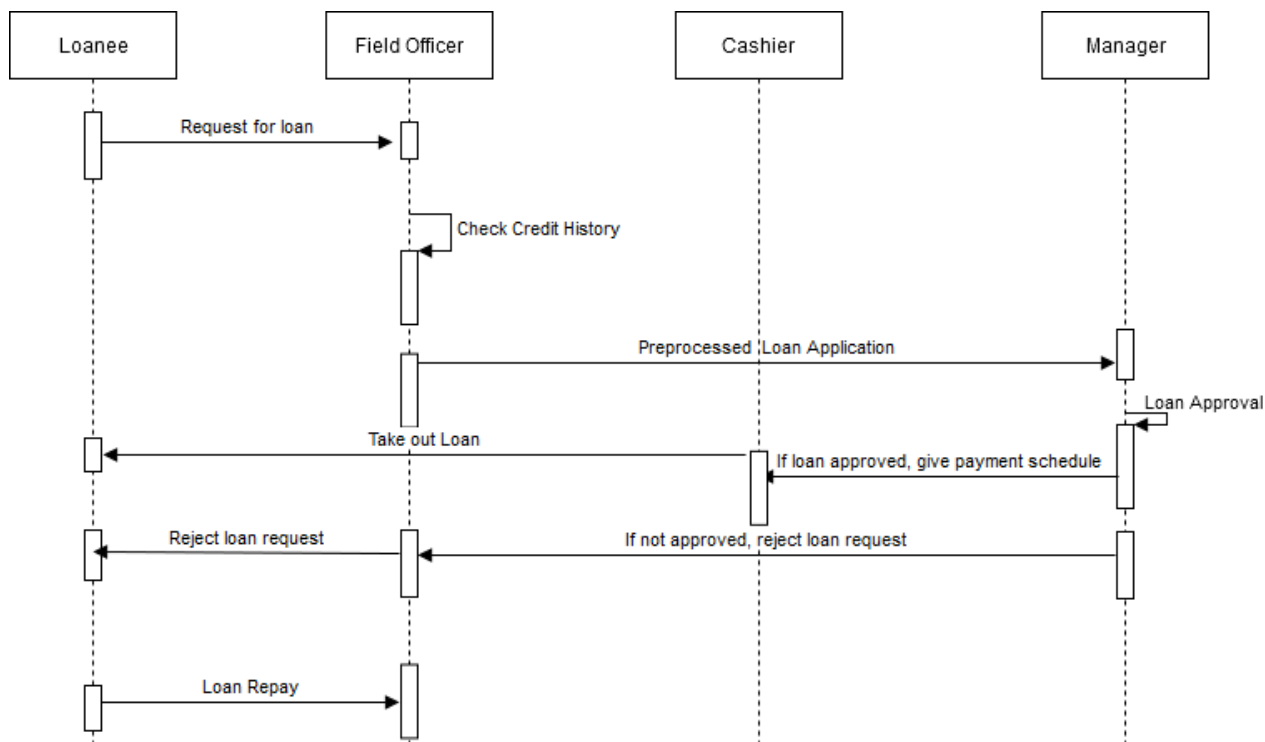


Figure 3.4: Loan System Sequence Diagram

Activity diagram:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step by step workflows of components in a system. An activity diagram shows the overall flow of control. An activity is shown as a rounded box containing the name of the operation.

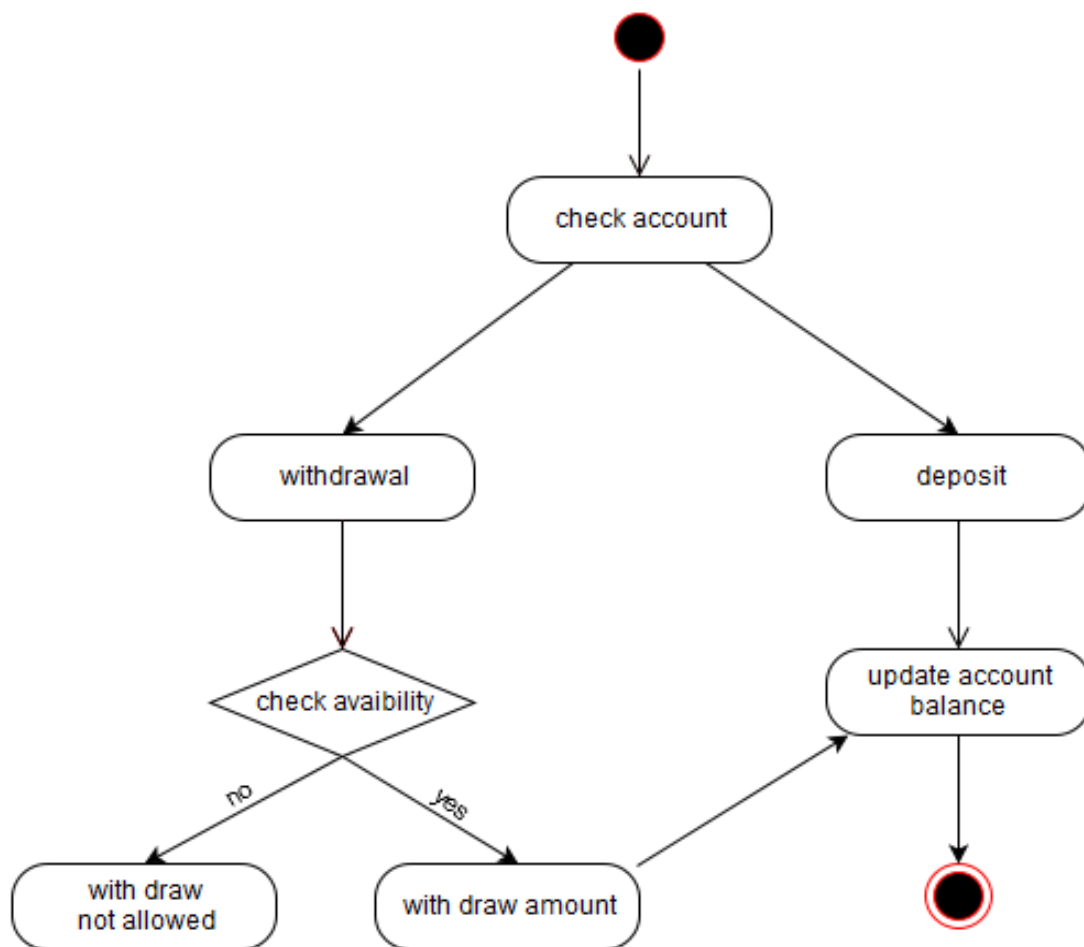


Figure 3.5: Cash System Activity Diagram

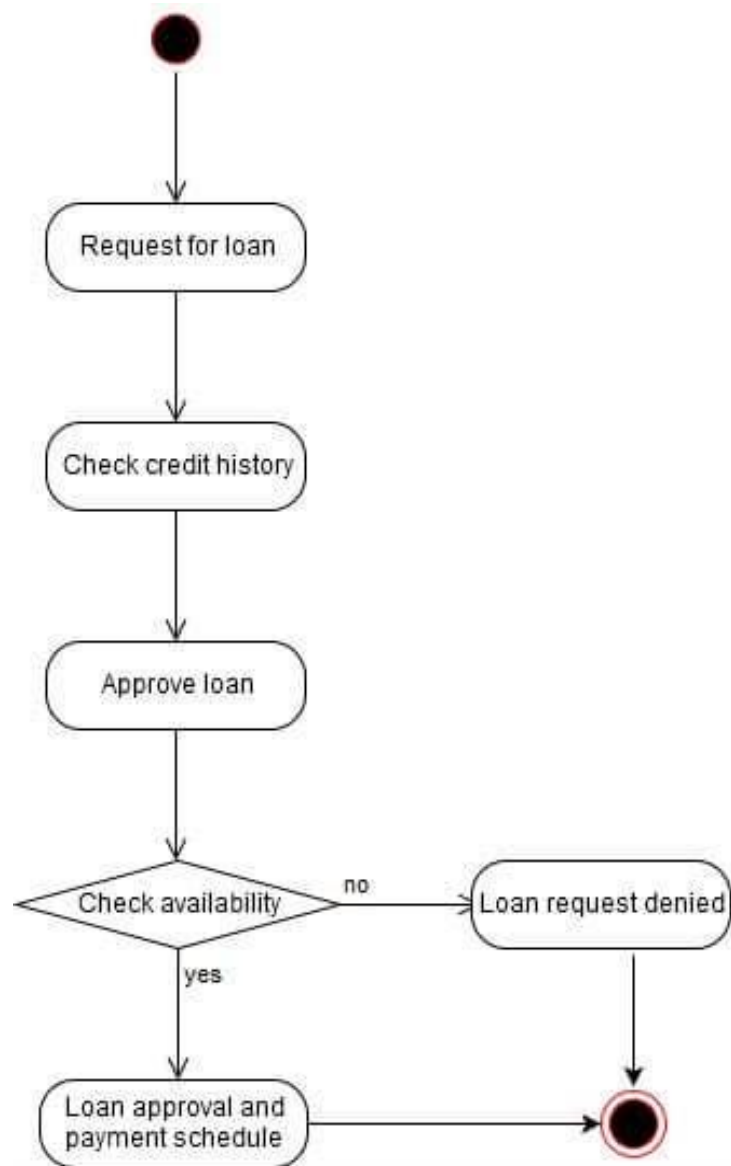


Figure 3.6: Loan System Activity Diagram

State Chart Diagram:

A state diagram, also called a state machine diagram or state chart diagram, is an illustration of the states an object can attain as well as the transitions between those states in the Unified Modeling Language (UML)

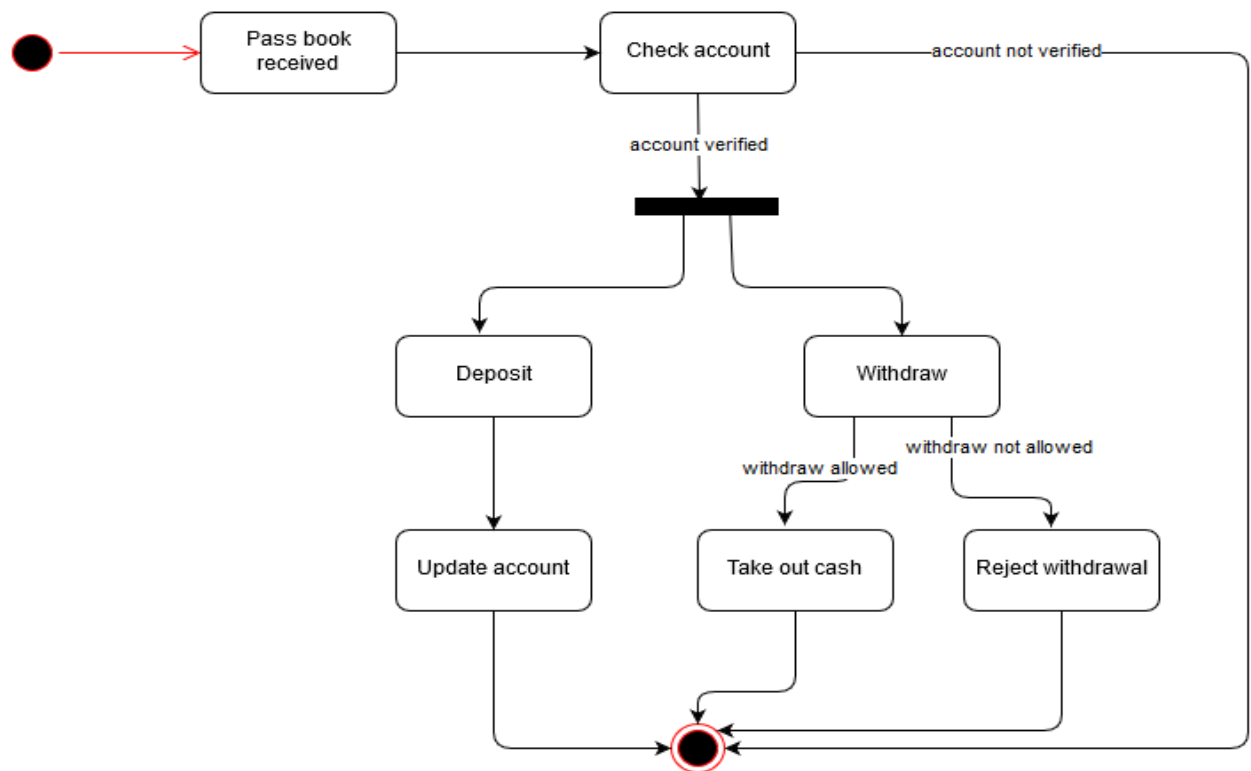


Figure 3.7: Cash System State Chart Diagram

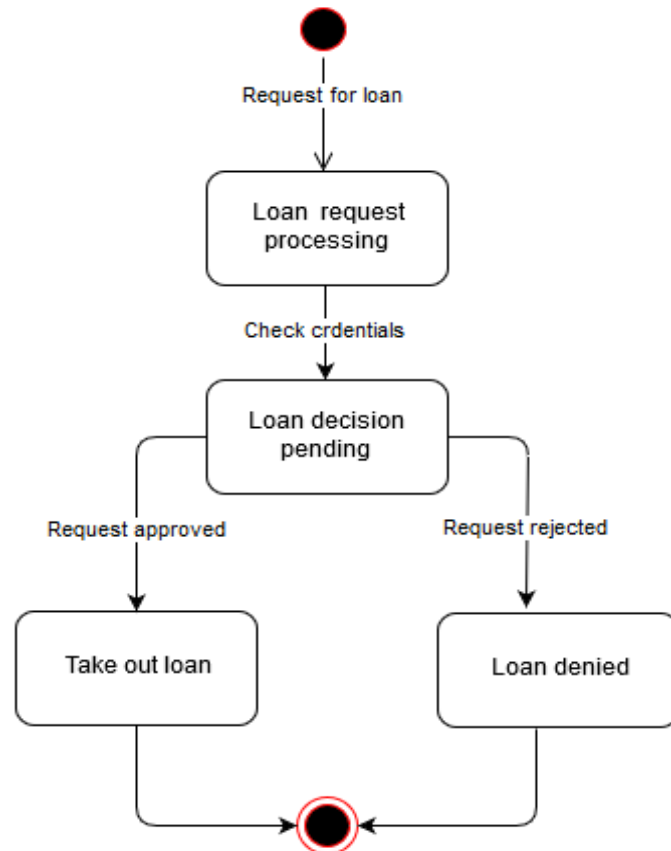


Figure 3.8: Loan System State Chart Diagram

Class Diagram:

A class diagram in the unified modelling language UML is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, and the relationships between the classes. It is represented using a rectangle with three Compartments. Top compartment have the class name, middle compartments the attributes and the bottom compartment with operations.

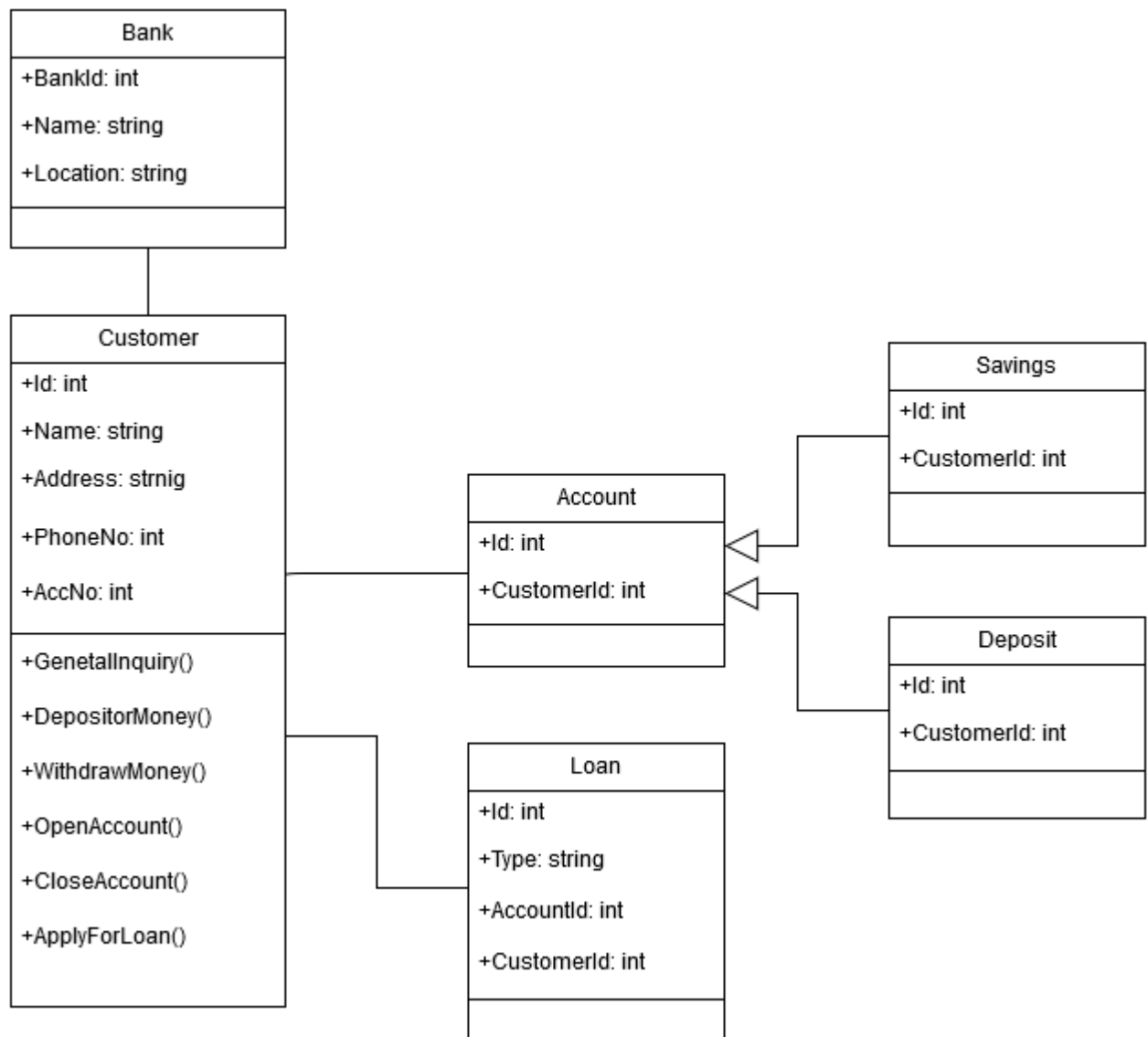


Figure 3.9: Banking System Class Diagram

Conclusion:

By using UML design, we have concluded that the core of our project has 2 parts. Which is act as single system and its parts will work as objects. Before doing this we had several doubt that how we will finish this job. But it became much easy and we can now decide that what can we do next as well as our implementation of the project became much easy.

Chapter Four

Feasibility Analysis of the Proposed System

Introduction:

It is possible to define broad goals for the project and detailed sub-goals from the gathered information. After quantifying these goals, the next step is to find out whether these goals can be met and how they will be met. Feasibility analysis is mainly concerned with these questions. The purpose of feasibility analysis is to make sure that we are on the right way to solve our respective problem. At the end of feasibility analysis, the cost-benefit analysis should be made and finally a proposed in detail should be prescribed. Our proposed solutions need to be evaluated on the basis of the following metrics.

1. Technical Feasibility
2. Operational Feasibility
3. Economic Feasibility

Since ours is a government organization, it mostly looks for operational and economic feasibility analysis or cost-benefit analysis that are discussed in the subsequent sections.

Proposal:

The information we gathered gave us several ideas which are good at different ways. But the main goal is to make this paper based system to a computerized system.

We have gathered 3 ideas which look better to us. The key method is that the clients come to take services and authority saves any kinds of data in paper. The whole process is time consuming and needs a lot of paper works. The existing system can't provide fast service. When it comes to search information it is no good at all.

We are going to propose a computerized system which can make all these works easy and provide efficiency.

- A. We convert the whole system to a computerized system, where there will no longer needs extra clients to do the job. Because this system will be fully automated and only the administrators of each department can modify the data or information to their section. The users don't need to come to bank, they can get services online using electronic devices. As a result, the organization can get economic benefit which needs to be spent behind paper or clients and the clients can save their time in addition they can have comfort.

- B. We can provide a computerized system and the employees are going to use this system to perform the operational tasks of the bank and store them on servers. So they need to be trained. This process will need computers with good configuration for each employee. And all of the computers will be local area connected to a server. We will use hosting service for the server from a reliable provider. The clients will need to come to the bank for their services. The field officer needs to be provided with a Tablet and an internet connection.
- C. We can provide a computerized system. But this time we will own a server for the system. On the time of overloading we can hire server as much as we need.

Cost Benefit Analysis:

A cost benefit analysis is necessary to determine economic feasibility. The primary objective of cost benefit analysis is to find out whether it is economically worthwhile to invest in the project. If the returns on the investment are good, then the project is considered economically worthwhile. Cost benefit analysis is performed by first listing all the cost associated with the project. Cost consists of both direct costs and indirect costs. Direct costs are those incurred by purchasing equipment, employing people, cost of consumable items etc. On the other hand, indirect cost includes those involving time spent by user in discussing problems with system analyst, gathering data about the problem etc. Benefits can be broadly classified as tangible benefits and intangible benefits. Tangible benefit is a benefit to a person or organization which can be directly measured. It is real benefit which is straight forward e.g. saving money. Intangible benefit is an indirect benefit which cannot be directly measured.

Technical and Operational feasibility analysis:

For solution A

- Solution A is not completely technically feasible. To develop a whole computerized system we need own server and computers with good configuration which is available but costly. The software cost and internet cost will be high too. Moreover

as the clients are the poor sections of the society all of them can't afford smart phone or PCs. If the company wants to provide the devices it is going to cost a lot.

- Solution A is not operationally feasible. Because in this solution we need to fire so many people that is not a good solution. As a government organization firing so many people will cause a massive strike against government. Moreover, government needs to recruit them in another job. That will be very difficult for the government.

For solution B

- The solution is technically feasible as PCs of necessary configuration is available. If we want to upgrade the existing PCs that would be possible but it won't be a feasible for long term operation since those machines don't have much lifetime. The field officers need Laptops which is affordable.
- It is also operationally feasible as staffs in office can be easily trained to use a PC and data entry. They have available training centers and trainers. The necessary problems will be written by system analyst, programmer hired for this purpose.

For solution C

- It looks technically feasible. Because all the equipments are available in the market and we will not face causality by fire people from works. It will need to pay attention to maintain the servers. Some extra employee will be needed here.
- It is also operationally feasible as staffs in office can be easily trained to use a PC and data entry. They have available training centers and trainers.

Economic feasibility analysis:

For solution B

For our proposal we need to have a hosting server. We can hire them from reliable provider.

So, per month it will cost at most 2400 tk.

So per year it will take $2400 \times 12 = 28800$ tk.

So, after 5 years it will take 144000 tk.

After providing the server we will need a person who will be in charge of maintenance.

So, if the salary is 15000 tk per month.

After 5 years it will be $15000 \times 12 \times 5 = 900000$ tk.

Each area consists of 11 branches.

Each branch needs two desktop PCs and 3 tablets for field officers.

Desktop PC costs 30000 tk and tablet costs 15000 tk.

Desktop cost = $11 \times 3 \times 30000 = 990000$ tk.

Tablet cost = $11 \times 3 \times 15000 = 495000$ tk.

Total cost = 1485000 tk.

Software cost is 100000tk.

At last we need to train the employees. This process will cost at most 100000tk.

So, total amount of cost is 2729000 tk.

By taking 7% interest, the amount will be $2729000 + 191030 = 2920030$ tk.

So, we get the idea that total amount is 2729000 tk. But if we don't provide this system and save this amount in bank we will get total of 2920030 tk.

This information is for 5 years.

Benefit

Savings per month = 60000 tk.

So, per year cost recovered in $2729000 / (60000 \times 5) = 9.01$ months.

For solution C

This idea is almost same as before, besides it will have a personal server besides the hired server. We only hire in case of necessity.

For our proposal we need to have a server which will cost at most 100000[৳] for general uses.

But the server may overload in the time of fair or special occasion when the pressure of work is too high. In this situation we will hire private server for temporary use. There may need at most 2 months, when the server will overload.

So, per month it will cost at most 2400 tk. So per year it will take $2400 \times 2 = 4800$ tk.

So, after 5 years it will take 24000 tk.

After providing the server we will need a person who will be in charge of maintenance.

So, if the salary is 15000 tk per month.

After 5 years it will be $15000 \times 12 \times 5 = 900000$ tk.

Each area consists of 11 branches.

Each branch needs two desktop PCs and 3 tablets for field officers.

Desktop PC costs 30000 tk and tablet costs 15000 tk.

Desktop cost = $11 \times 3 \times 30000 = 990000$ tk.

Tablet cost = $11 \times 3 \times 15000 = 495000$ tk.

Total cost = 1485000 tk.

Software will cost = 100000 tk.

At last we need to train the employees. This process will cost at most 100000 tk.

So, total amount of cost = 2709000 tk.

By taking 7% interest, the amount will be $2709000 + 189630 = 2898630$ tk. So, we get the idea that total amount is 2709000 tk. But if we don't provide this system and save this amount in bank we will get total of 2898630 tk.

This information is for 5 years.

Benefit

Savings per month = 60000 tk.

So, per year cost recovered in = $2898630 / (60000 \times 5) = 9.66$ months.

We can recover the cost faster in solution B. But C is more suitable than solution B. Because the indirect benefit of the solution C is better than solution B. If we hire a server after 5 years the total amount of cost against the server is 144000 tk. But if we buy a server we only need a permanent cost in the time of buying. That is 100000 tk.

For this reason, solution C is better solution. Moreover, we can use server more than 5 years.

Conclusion:

Here we have come to a solution with maximum benefit. This can help Bangladesh Handloom board to keep pace with the technology and minimize the cost with ease. We have considered all areas with maximum security to propose a system that will be up and running in mere time span.